Discovery of human antibodies against black cobra toxins

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Discovery of human antibodies against black cobra toxins

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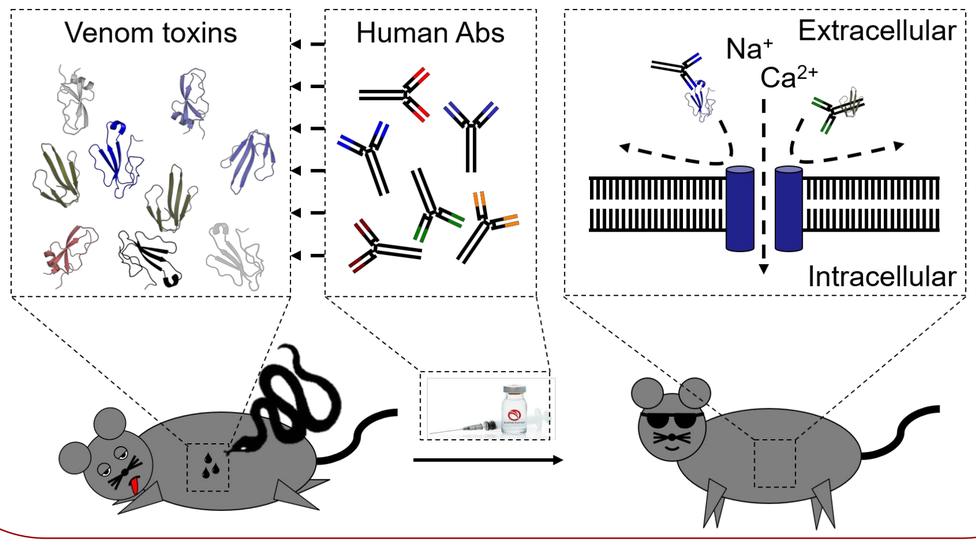
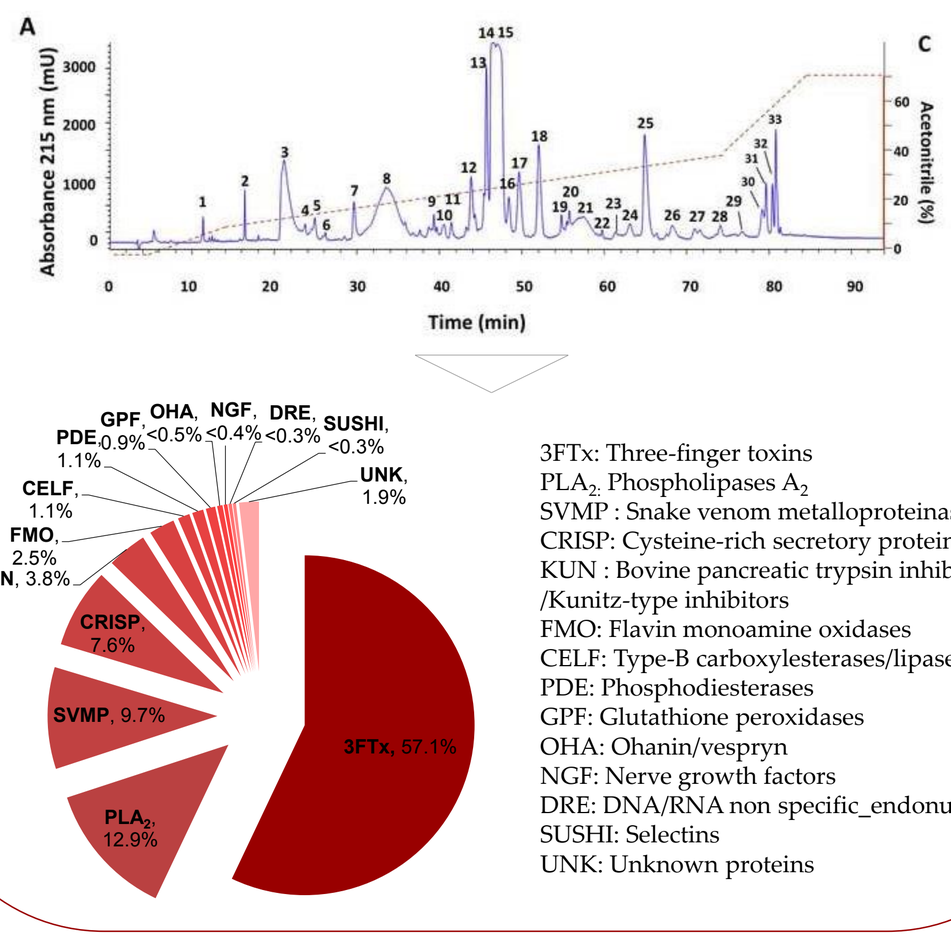
1 Recombinant antivenom – a new hope!

Snakebite envenoming represents a major health threat in tropical parts of the developing world[1]. Animal-derived antisera currently constitute the only effective treatment option, but are associated with severe side effects due to incompatibility with the human immune system[2]. We aim at discovering human antibodies that target the medically most important toxins from *N. melanoleuca* venom using phage display technology.

2 Antibody-mixtures may protect against envenoming by targeting several toxins

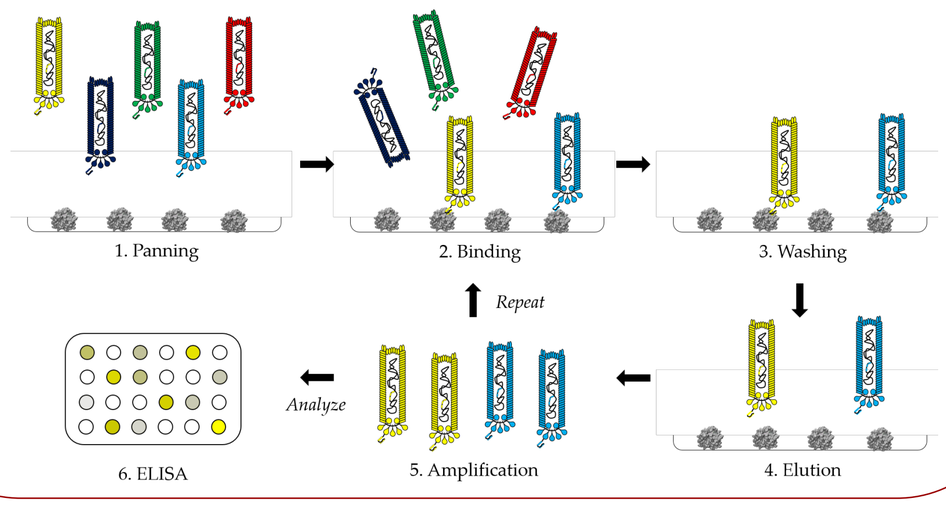


3 Toxin composition of *N. melanoleuca* venom

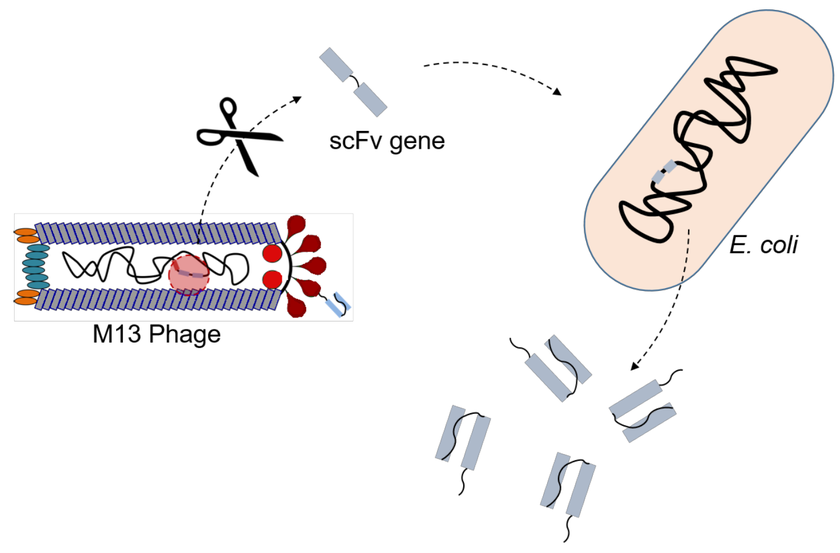


3FTx: Three-finger toxins
PLA_2: Phospholipases A_2
SVMP : Snake venom metalloproteinases
CRISP: Cysteine-rich secretory protein
KUN : Bovine pancreatic trypsin inhibitors /Kunitz-type inhibitors
FMO: Flavin monoamine oxidases
CELF: Type-B carboxylesterases/lipases
PDE: Phosphodiesterases
GPF: Glutathione peroxidases
OHA: Ohanin/vespryn
NGF: Nerve growth factors
DRE: DNA/RNA non specific_endonucleases
SUSHI: Selectins
UNK: Unknown proteins

4 Selection of high-affinity antibodies using scFv displaying phages



5 Expression of soluble scFvs in *E. coli*



6 IgGs against black cobra neurotoxins

We hope to discover human scFvs against medically important neurotoxins from *N. melanoleuca*. These may be converted to human IgGs for prolonged protection against systemic neurotoxicity in human snakebite victims.
This may help bring recombinant antivenoms with higher efficacy and fewer side effects to the market!

References

[1]] WHO fact sheet: http://www.who.int/mediacentre/factsheets/fs337/en/ [Accessed 30th of August 2016]
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[3] Laustsen AH. (2016) Recombinant Antivenoms. University of Copenhagen.
[4] Lauridsen LP, Laustsen AH, Lomonte B, Gutiérrez JM. (2016) Exploring the venom of the forest cobra; Toxicovenomics and antivenom profiling of the Naja melanoleuca snake, Submitted to Journal of Proteomics
[5] Image found on http://pngimg.com/img/animals/snake [Accessed 30th of August 2016]

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